

Philosophy 330: Philosophy of Science

California State University, Northridge

Spring 2020

Course Info

Course: PHIL 330

Title: Philosophy of Science

Section: 14326

Class times: Mondays & Wednesdays 2:00PM - 3:15PM

Room: Extended Univ Commons 134

Instructor Info

Instructor: Mitchell Herschbach

Instructor's email: mitchell.herschbach@csun.edu

Office: Sierra Tower 535

Office Hours: Mondays & Wednesdays 11:00AM – 12:00PM and by appointment

Office Phone: (818) 677-2745 Note: call only during office hours—cannot leave a message

Course website: Canvas

Prerequisites

Completion of the lower division writing requirement.

Catalog Description

Analysis of the concepts reality, knowledge, mind and theory that attempts to answer the question: What is the character of the scientific picture of human beings and nature?

Topics

This course is an introduction to core issues in the philosophy of science. We will try to better understand what science is by investigating:

- the methods and reasoning processes engaged in by scientists
- the nature of the theories, models, and explanations offered by scientists
- the debate between scientific realism and anti-realism about how scientific theories relate to the world
- how scientific ideas change over time
- how the history of science informs philosophical accounts of science
- the role of human values in science

Course Goals and Objectives

Students will:

- Gain an understanding of central concepts and issues in philosophy of science
- Improve your ability to identify, explicate, and evaluate the thesis of a philosophical article, as well as the reasons a philosopher puts forward in support of their thesis.
- Improve your ability to write clearly, precisely, concisely, logically, and persuasively, including:
 - Improve your ability to clearly express what a philosopher's position is, as well as the reasons they give in favor of it.
 - Improve your ability to clearly express your own position, as well as the reasons you have in favor of it.
 - Improve your ability to structure an essay so that its progression is logical and easy to follow.
- Improve your ability to diagnose the shortcomings and the strengths of another philosopher's position.
- Improve your ability to diagnose the shortcomings and the strengths of your own position, as well as learning how to bolster your own position with reasoned arguments.

Role in the General Education Program

This course satisfies the following General Education requirement:

Subject Explorations: Arts and Humanities (Section C) GE Requirement

Goal: Students will understand the rich history and diversity of human knowledge, discourse and achievements of their own and other cultures as they are expressed in the arts, literatures, religions and philosophy.

Student Learning Outcomes

Students will:

1. Explain and reflect critically upon the human search for meaning, values, discourse and expression in one or more eras/stylistic periods or cultures.
2. Analyze, interpret and reflect critically upon ideas of value, meaning, discourse and expression from a variety of perspectives from the arts and/or humanities.
3. Produce work/works of art that communicate to a diverse audience through a demonstrated understanding and fluency of expressive forms.
4. Demonstrate ability to engage and reflect upon their intellectual and creative development within the arts and humanities.
5. Use appropriate critical vocabulary to describe and analyze works of artistic expression, literature, philosophy or religion and a comprehension of the historical context within which a body of work was created or a tradition emerged.
6. Describe and explain the historical and/or cultural context within which a body of work was created or a tradition emerged.

Writing Intensive GE Requirement

Goal: Students will develop their abilities to express themselves and the knowledge they have obtained through practicing various forms of writing within different disciplinary contexts. Writing intensive courses will build upon the skills gained in the Written Communication section of Basic Skills. In each WI course, students will be required to complete writing assignments totaling a minimum of 2,500 words.

Student Learning Outcomes

Students will:

1. Develop and clearly define their ideas through writing.
2. Ethically integrate sources of various kinds into their writing.
3. Compose texts through drafting, revising and completing a finished product.
4. Express themselves through their writing by posing questions, making original claims and coherently structuring complex ideas.
5. Revise their writing for greater cogency and clarity.
6. Utilize adopted communication modes and documentation styles of specific disciplines (MLA, APA, Chicago, CBE, etc.) where appropriate.

Course Materials

- Required Textbook, available through the campus bookstore:
PS:VSI *Philosophy of Science: A Very Short Introduction*, by Samir Okasha. Oxford University Press. 2nd edition, 2016. ISBN: 0198745583.
- All other readings and other course materials will be posted on Canvas (<https://canvas.csun.edu/>)

Course Requirements

1. Class Attendance (5%)

You are expected to read the assigned texts before coming to class and arrive to class prepared to discuss them. These in-class discussions will be essential to your adequately understanding the required texts and ultimately doing well on course assignments. This is why attendance is part of your overall grade in this course.

I will take attendance at the beginning of every class. If you arrive on time, you will earn 100% of the points for that day's attendance. If you arrive less than 15 min late, you will earn 80% of the points for that day's class. If you arrive more than 15 minutes late, you will earn zero points for that day's attendance.

If you arrive late, it is your responsibility to ensure that I mark you as present, without disrupting the flow of class. See below my policy about legitimate excuses for missing class.

You are expected to participate in all class activities by: having copies of the assigned texts with you, so we can refer to specific passages; actively listening to lecture; verbally responding to my questions; asking questions; commenting during class discussions; and completing any other in-class projects, activities or assignments. If you participate in these ways, you will earn full credit for your attendance. If you fail to participate in these ways, you will lose points from your attendance grade.

2. Homework: Reading Quizzes and Written Assignments (30%)

Homework assignments will be of two types:

a. *Reading Quizzes*: To ensure you are doing the readings before class and coming to class prepared to discuss them, you will complete a reading quiz testing your completion and basic comprehension of each assigned reading. For each reading assignment, the associated reading quiz must be completed by 9am the day we're going to begin discussing that text. These quizzes are untimed. You are allowed up to two attempts on each quiz; if you attempt a quiz twice, your graded score will be the *average* of your scores on those two attempts (e.g., if you earned 50% on the first attempt, and 100% on the second attempt, your overall score will be 75%).

b. *Written Assignments*: Several times throughout the semester you will be given homework assignments requiring written responses. These will require you to, for example, summarize claims in the readings, or respond to them. These assignments will be graded mostly on your effort in completing the assignment, rather than the accuracy of your responses. More precise grading criteria will be included with the assignment instructions.

I will drop your two lowest homework scores.

3. Exams (65% total)

You will take three in-class exams:

Exam #1: 15%

Exam #2: 20%

Comprehensive Final Exam: 30%

Exams will consist of multiple-choice, short-answer, and essay questions. I will more fully describe the question types several weeks before the first exam.

Exam #1 is on the material from the first third of the course. Exam #2 will mostly be on the middle section of the course, but will also retest you on material from Exam #1. The Final Exam will be comprehensive, covering material from the entire semester, with an emphasis on the new material from the last third of the course.

Grades

Grades are not negotiated. They are earned, based on your scores on the assignments listed above.

Letter grades will be assigned using the plus/minus system, as follows:

A	=	93-100%	B+	=	87-89.9%	C+	=	77-79.9%	D+	=	67-69.9%	F	=	0-59.9%
A-	=	90-92.9%	B	=	83-86.9%	C	=	73-76.9%	D	=	63-66.9%			
			B-	=	80-82.9%	C-	=	70-72.9%	D-	=	60-62.9%			

No Extra Credit

I will assign no extra-credit work. There is nothing that you, individually or collectively, can do for extra credit.

Expectations of Students

I expect you to:

- carefully read the assigned texts before the class meeting indicated on the syllabus
- bring the assigned texts to class with you
- attend class and participate in class activities and discussion
- complete all homework assignments on Canvas
- regularly (at least once a day) check your CSUN email for announcements about the course made via Canvas. If you prefer to use another email account, make sure that you have your CSUN email forwarded to the other email account.
- if you have any questions or problems, come see me during office hours or contact me via email—I'm here to help!

Policies

Email

Email is a good way to reach me to ask questions about the course. I will do my best to respond to emails within 24 hours—though I often respond much sooner than that. For questions that need a longer response, I may ask you to meet in person.

General Policy About Excuses for Missing Class or an Assignment Deadline

I understand that life is complicated and lots of things can interfere with your school responsibilities. In general, try to keep me in the loop. That is, let me know what's going on as soon as you can. I will do my best to work you. But if you never let me know what's going on in your life, I won't be able to help you—because I won't know about it!!

But I do work to hold a line between legitimate and illegitimate excuses for missing class or not completing an assignment on time:

Legitimate excuses include (but are not restricted to) being ill, having a family emergency, or having an unexpected work conflict.

Having an assignment for another course due the same day, for example, is not a legitimate excuse.

Classroom Conduct

Please arrive to class on time. Students should be respectful of their fellow classmates, allowing them to finish before speaking, listening to and respecting classmates' views/opinions. In addition, students must silence all telephones, music players, etc., before entering the classroom. Laptops and other electronic devices may only be used for note taking.

Special Accommodations

If you have a disability and need accommodations, please register with the Disability Resources and Educational Services (DRES) office or the National Center on Deafness (NCOD), and inform me as soon as possible of any accommodations they determine you are eligible for. The DRES office is located in Bayramian Hall, room 110 and can be reached at (818) 677-2684, <http://www.csun.edu/dres/index.php> NCOD is located on Bertrand Street in Jeanne Chisholm Hall and can be reached at (818) 677-2611, <http://www.csun.edu/ncod/>

If you would like to discuss your need for accommodations with me, please contact me to set up an appointment.

Academic Integrity

Students are expected to conduct themselves in accord with university policies on Student Conduct and Academic Dishonesty, which are found in the University Catalog:

[Definition of Academic Dishonesty](#)

[Penalties for Academic Dishonesty](#)

Cheating will not be tolerated, and any student who violates this policy will, at a minimum, earn a zero for the assignment; further punishment may include failing the class and being subject to further disciplinary actions from the University. You are responsible for familiarizing yourself with these policies; ignorance is not an excuse. If you have any questions about these policies, feel free to contact me.

Title XI: Sexual Misconduct Disclosures and Maintaining and Respectful Learning Environment

Students and faculty each have responsibility for maintaining a safe and respectful space to express their reasoned opinions. Professional courtesy and consideration for our classroom community are especially important with respect to topics dealing with differences in race, color, gender and gender identity/expression, sexual orientation, national origin, religion, disability, and age.

In this course, the topic of sex (including sexual misconduct/sexual violence) may emerge either purposefully or inadvertently in readings, films, class discussions or other class materials. We recognize that such topics may be particularly upsetting for some survivors; we encourage all students to seek the support they need. While making personal connections with the topics studied in any course can be a meaningful and important endeavor, please be aware of the following policy regarding confidentiality and disclosures of incidents of sexual misconduct/sexual violence.

As your instructor, one of my responsibilities is to help maintain a safe learning environment on our campus. In the event that you choose to write, speak, or otherwise disclose having experienced sexual misconduct/sexual violence, including rape, sexual assault, sexual battery, dating violence, domestic violence, or stalking, and specify that this violence occurred while you or the perpetrator were a CSUN student, federal and state laws require that I, as a "responsible employee," notify our campus Title IX Coordinator. The Title IX Coordinator will contact you to inform you of your rights and options as a survivor and connect you with support resources, including possibilities for holding accountable the person who harmed you. Know that you will not be forced to share information and your level of involvement will be your choice.

CSUN's Title IX Coordinator is:

Susan Hua
University Hall, Room 285
Phone: (818) 677-2077
E-Mail: susan.hua@csun.edu

If you do not want the Title IX Coordinator notified, instead of disclosing the experience to me, you can speak confidentially with our Campus Care Advocate.

CSUN's Campus Care Advocate is:

Katie LaRue
Klotz Student Health Center, Room 140G
Phone: (818) 677-7492
E-mail: katelin.larue@csun.edu

Course Schedule

This schedule is tentative and subject to revision. The deadlines posted on Canvas constitute the official course schedule.

	Date	Topics and Readings
Week 1	Mon 1/20	NO CLASS – MARTIN LUTHER KING, JR. DAY
	Wed 1/22	Course introduction: What is Philosophy of Science? Okasha, "What is science?" <i>PS:VSI</i> , pp. 1-16
Week 2	Mon 1/27	Introduction to Arguments Vaughn, "Arguments Good, Bad, and Weird"
	Wed 1/29	Scientific Reasoning: Problems of Induction Okasha, "Scientific inference," <i>PS:VSI</i> , pp. 16-36 Godfrey-Smith, "Induction and Confirmation," <i>Theory and Reality</i> , pp. 39-46
Week 3	Mon 2/3	Godfrey-Smith, "Induction and Confirmation," <i>Theory and Reality</i> , pp. 46-50
	Wed 2/5	Scientific Reasoning: The Hypothetico-Deductive Method and Popper's Falsificationism Popper, "Science: Conjecture and Refutations"
Week 4	Mon 2/10	Review previous
	Wed 2/12	Scientific Reasoning: Holistic Theory Testing Duhem, "Physical Theory and Experiment" (sect. 1-3)
Week 5	Mon 2/17	Review for exam
	Wed 2/19	Exam #1
Week 6	Mon 2/24	The Deductive-Nomological (D-N) Model of Explanation Okasha, "Explanation in Science," <i>PS:VSI</i> , pp. 36-40 ("Hempel's covering law model") Hempel, "Laws and their Role in Scientific Explanation," pp. 47-58
	Wed 2/26	Criticisms of the D-N Model Okasha, "Explanation in Science," <i>PS:VSI</i> , pp. 41-44 ("The Problem of Symmetry" and "The Problem of Irrelevance") Salmon, "Four Decades of Scientific Explanation," Section 2.3, pp. 46-50
Week 7	Mon 3/2	The Inductive-Statistical (I-S) Model of Explanation Hempel, "Laws and their Role in Scientific Explanation," pp. 58-69 (you can skim section 5.5, pages 59-67)
	Wed 3/4	Refinement and criticisms of the I-S Model Salmon, "Four Decades of Scientific Explanation," Sections 2.4-2.5, pp. 50-60 <i>Note: Salmon makes reference to example CE-5 (about Syphilis and paresis) from page 49</i>
Week 8	Mon 3/9	Causal Explanation Okasha, "Explanation in Science," <i>PS:VSI</i> , pp. 44-48 Rosenthal, "Causation, Inexact Laws and Statistical Probabilities" (focus on pages 81-89)
	Wed 3/11	Bechtel & Abrahamsen, "Explanation: A Mechanistic Alternative"
Week 9	Mon 3/16	NO CLASSES – SPRING BREAK
	Wed 3/18	
Week 10	Mon 3/23	Review for exam
	Wed 3/25	EXAM #2

Week 11	Mon 3/30	Scientific Realism vs. Anti-Realism Okasha, "Realism and Anti-Realism," <i>PS:VSI</i> , pp. 54-58 "Why quantum mechanics might need an overhaul"
	Wed 4/1	Okasha, "The observable/unobservable distinction," <i>PS:VSI</i> , pp. 62-66 Maxwell, "The Ontological Status of Theoretical Entities"
Week 12	Mon 4/6	Van Fraassen, "Arguments Concerning Scientific Realism"
	Wed 4/8	Okasha, "The 'no miracles' argument," <i>PS:VSI</i> , pp. 58-62 Okasha, "The underdetermination argument," <i>PS:VSI</i> , pp. 66-70
Week 13	Mon 4/13	Reduction, Scientific Progress and Unification Okasha, "Explanation and Reduction," "Scientific Change and Scientific Revolutions: Logical Positivist Philosophy of Science," <i>PS:VSI</i> , pp. 55-57, 77-80 Barker & Kitcher, "The Ideal of Unified Science," <i>Philosophy of Science: A New Introduction</i> , pp. 51-55
	Wed 4/15	Kuhn on Scientific Change and Rationality Okasha, "Scientific Change and Scientific Revolutions," <i>PS:VSI</i> , pp. 71-78 Kuhn, selections from <i>The Structure of Scientific Revolutions</i> , sect. I-VIII, pp. 489-501
Week 14	Mon 4/20	Kuhn, selections from <i>The Structure of Scientific Revolutions</i> , sect. IX-XIII and Postscript (pp. 501-512) Okasha, "Scientific Change and Scientific Revolutions," <i>PS:VSI</i> , pp. 78-88
	Wed 4/22	Values, Bias, and the Rationality of Science Okasha, "Is Science Value Free?," <i>PS:VSI</i> , pp. 123-130 Kathleen Okruhlik, "Gender and the Biological Sciences" (pp. 21-31)
Week 15	Mon 4/27	Okruhlik, "Gender and the Biological Sciences" (pp. 31-42)
	Wed 4/29	Anderson, "Uses of Value Judgments in Science: A General Argument, with Lessons from a Case Study of Feminist Research on Divorce"
Week 16	Mon 5/4	Barker & Kitcher, "Anti-Science," <i>Philosophy of Science. A New Introduction</i> , pp. 122-125
	Wed 5/6	Review for exam
Exam week	Mon 5/11	Final Exam 3:00PM - 5:00PM